

What is claimed is:

1. A process for fabricating a whole solid-state pH sensing device by using polypyrrole as the contrast pH detector, said process comprising following steps:
5 step 1: preparing various solid-state substrates and selecting an appropriate substrate based on the solid-state sensing material and the sensing environment;
 step 2: depositing a solid-state sensing material on said substrate;
10 step 3: routing the device;
 step 4: using a epoxy resin to seal the material and fixing the sensing window area; and
 step 5: then immersing the device into a electro polymerizing solution, and electro-polymerizing
15 polypyrrole, thus completing the fabrication of the whole solid-state pH sensing device.

2. A process for fabricating a whole solid-state pH sensing device by using the polypyrrole as the contrast
20 pH detector as recited in Claim 1, wherein the step of electro-polymerizing polypyrrole comprises following steps:
 step A: preparing said finished conductive substrate;
 step B: preparing said electro-polymerizing solution,
25 which comprises a buffer solution, electrolytes, the

monomer of polypyrrole;

step D: connecting the substrate to the positive electrode of the power supply, and connecting a platinum electrode to the negative electrode of the power supply, and immersing the substrate into said electro-polymerizing solution, where the power supply provides a constant potential which is higher than the oxidizing potential of said polypyrrole, in a manner that said polypyrrole can be polymerized on said substrate;

step E: immersing the polypyrrole sensor into the de-ionized water to clean said polypyrrole sensor;

step F: removing and drying said sensing device, thus completing the fabrication of the polypyrrole sensor.

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3. A process for fabricating a whole solid-state pH sensing device by using the polypyrrole as the contrast pH detector as recited in Claim 1, wherein said solid-state substrate is selected from the group consisting of a silicon substrate, a glass substrate, a ceramic substrate or a plastic substrate.

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4. A process for fabricating a whole solid-state pH sensing device by using the polypyrrole as the contrast pH detector as recited in Claim 1, wherein said sensing

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material is selected from the group consisting of a tin dioxide membrane or other solid-state conductive ion-sensing membrane.

5 5. A process for fabricating a whole solid-state pH sensing device by using the polypyrrole as the contrast pH detector as recited in Claim 1, wherein said polymerizing solution of the polypyrrole comprises a buffer solution, salts, polypyrrole, such as the electro-
10 polymerizing solution comprising a phosphate solution, potassium chloride, and polypyrrole; wherein, through changing the composition of said polymerizing solution, the control of the sensitivity of said polypyrrole sensor can be achieved, and wherein this technology can be
15 applied to fabricate the corresponding sensing electrode with an appropriate sensitivity and the control of the sensitivity of the differential pair pH sensing device can be obtained.

20 6. A process for fabricating a whole solid-state pH sensing device by using the polypyrrole as the contrast pH detector, said process comprises:
depositing a non-insulating solid-state ion-sensing membrane on a insulating substrate or non-insulating
25 substrate;

using a conductive wire as the signal transmission line;
using a seal material such as a epoxy resin to seal and
coat the non-sensing area;
using encapsulation technology to define the sensing
area of the sensing device to fabricate the pH sensor
and the reference electrode;
thereafter, immersing the finished device into a
polymerizing solution of polypyrrole, and polymerizing
polypyrrole on a tin dioxide membrane, thus complete
the fabrication of the polypyrrole sensor;
wherein by virtue of the electrode feature formed from
three sensing windows, said differential pair
electrochemical pH Sensing device is thus constructed.

7. A process for fabricating a whole solid-state pH
sensing device by using the polypyrrole as the contrast
pH detector, said process as recited in claim 6, wherein
said three sensing windows are a reference electrode, a
polypyrrole sensor and a pH sensor.

8. A process for fabricating a whole solid-state pH
sensing device by using the polypyrrole as the contrast
pH detector, said process as recited in claim 6, wherein
said electrodes are all solid-state electrodes, and are
planar frameworks, do not need to immerge in the

buffer solution for storage, and hence is easy to preserve and the feature is unlikely affected by the environmental interference.